Nov. 3, 1936. H. HIXON, SR 2,059,639

SPRAY DEVICE FOR USE IN MINES

Filed March 30, 1935 2 Sheets-Sheet 1

Fig. 1.

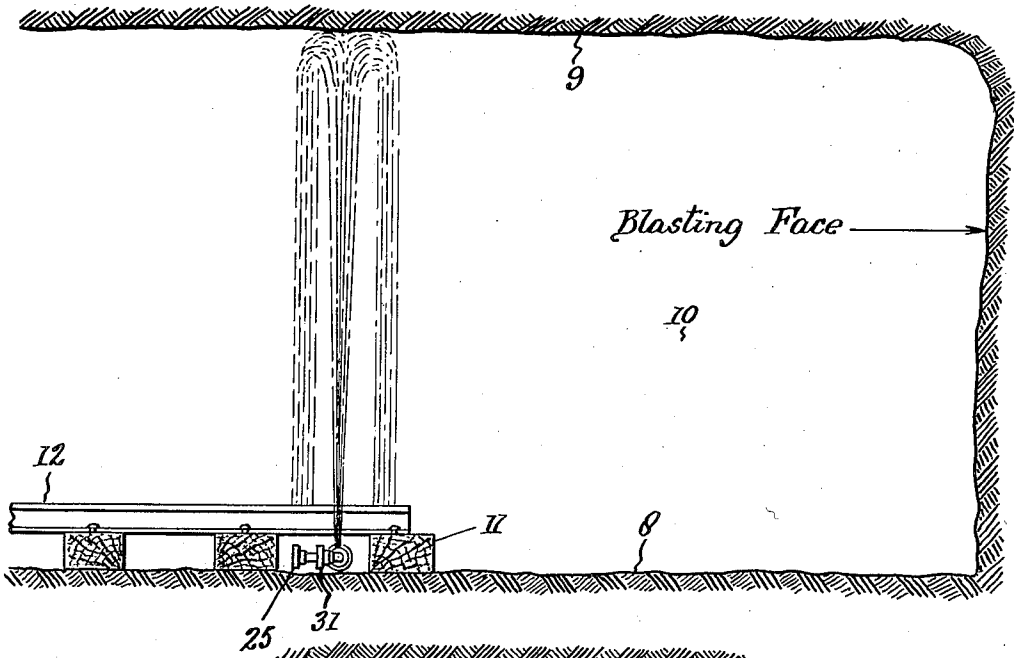
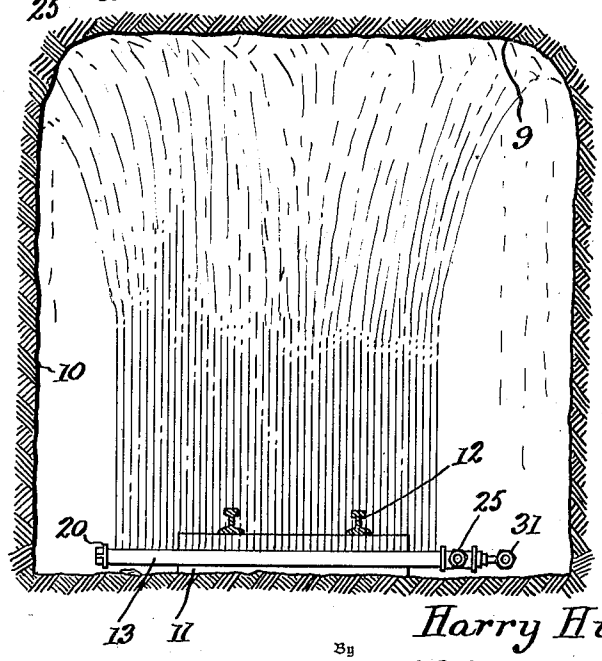


Fig. 2.



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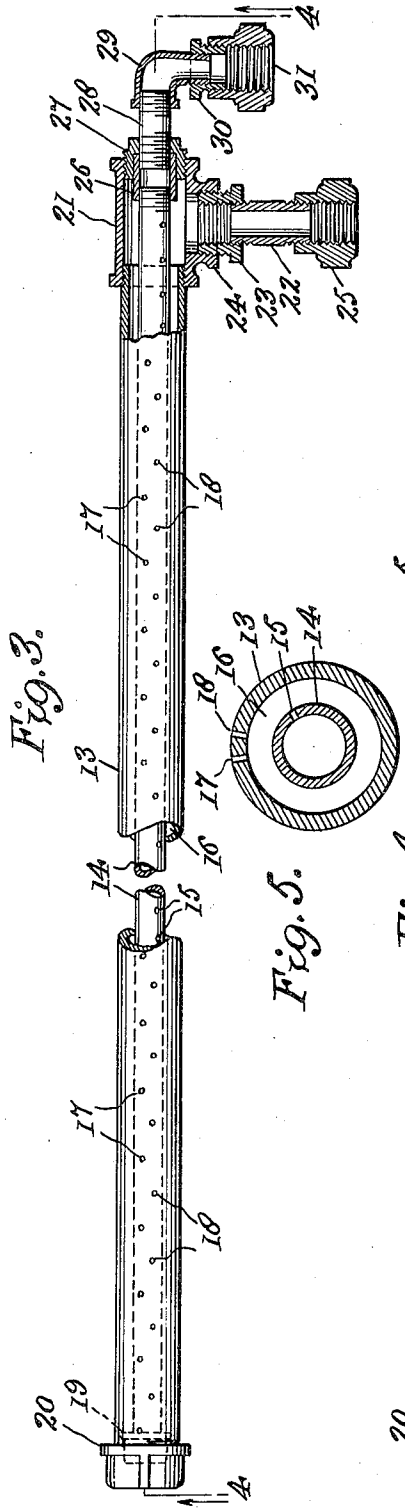


Fig. 3.

Fig. 5.

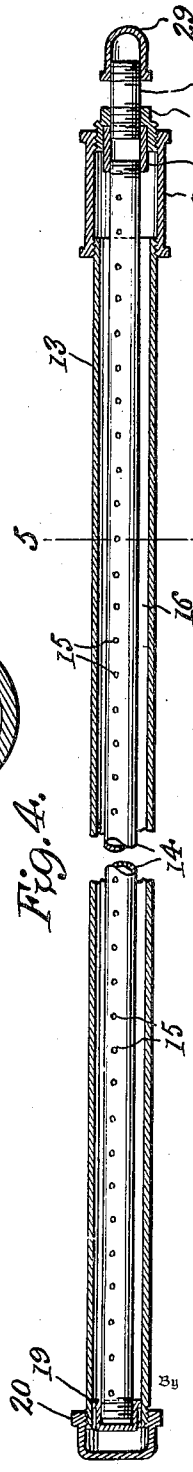


Fig. 4.

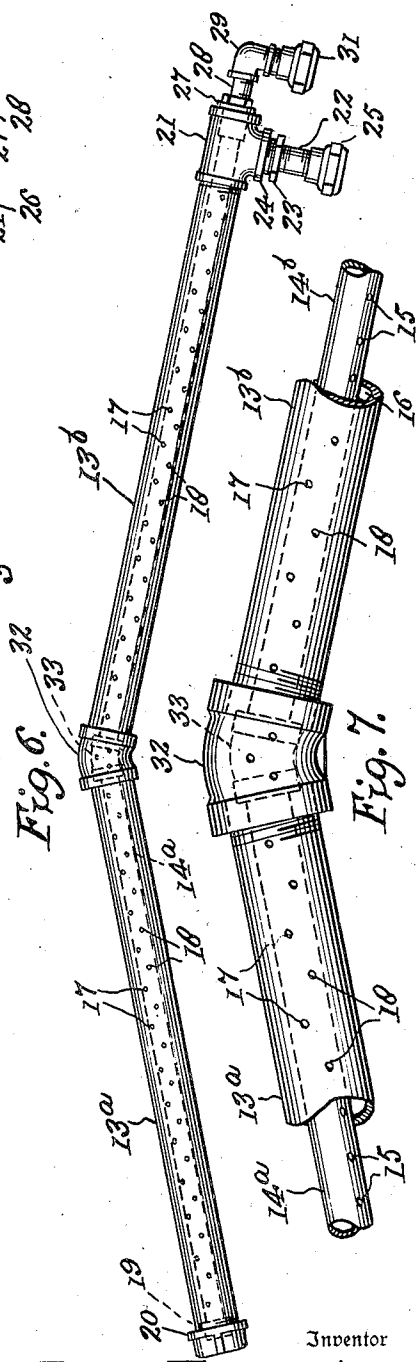


Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE

2,059,639

SPRAY DEVICE FOR USE IN MINES

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Application March 30, 1935, Serial No. 13,959

4 Claims. (Cl. 299—140)

The present invention relates to improvements in spray devices for use in mines, and has for an object to provide a device for throwing up a water or vapor screen in a mine to absorb noxious gases.

Due to the fact that all mine drifts have but one way for the gases, formed by blasting, to escape, and that, through this gas and dust, the miners must return several times in order to get their rounds completely placed, they consequently inhale some of these impurities, even with the use of respirators.

Also, the use of respirators by the miners who are blasting does not do away with the harmful effects of their blasting, as this gas and dust travels by ventilation currents and comes in contact with other miners not using respirators.

It is the purpose of the invention to lay this dust and absorb the gas by providing a water or vapor spray at an appropriate place in the mine.

It is a further object of the invention to provide a portable spray device which may be moved forward as the blasting progresses.

It is a further object of the invention to provide an improved spray device which will be of simple construction, capable of ready application in use, and such as will produce a strong spray under relatively strong pressure so as to fill the entire cross-section of the drift to the end that the gases in any great volume will not be permitted to pass such spray.

With the foregoing and other objects in view, which will be apparent to those skilled in this art, the invention will be more fully described hereinafter, and more particularly pointed out in the appended claims.

In the drawings, wherein like parts are denoted by the same reference characters throughout the several views,

Figure 1 is a longitudinal section through a mine drift illustrating the position and use of an improved spray device constructed according to the present invention.

Figure 2 is a cross-section through the drift showing the improved device in side view.

Figure 3 is a plan view, taken on an enlarged scale, with parts broken away and parts shown in section, of the improved spray device.

Figure 4 is a longitudinal section taken on the line 4—4 in Figure 3.

Figure 5 is a cross-section, taken on an enlarged scale on the line 5—5 of Figure 4.

Figure 6 is a plan view showing a modified form of the device, and

Figure 7 is an enlarged plan view of the same with parts broken away.

Referring now more particularly to the drawings, Figures 1 and 2 show a mine drift with the blasting face so denominated in Figure 1. The bottom of the drift is indicated at 8, the top of the drift at 9 and the side walls at 10. In the drift is the railway including the ties 11 and the rails 12. The improved device is in the nature of a pipe, of a portable character adapted to occupy the space between adjoining ties 11 and admitting of being thrust beneath the rails 12. In Figures 1 and 2 the device is shown as projecting a spray of water, or water vapor, upwardly in a sheet of substantial thickness and under suitable pressure to cause the stream to impinge against the roof 9 of the drift. In Figure 2 the sheet is shown to extend across the cross-section of the drift so that most of the gases resulting from the blasting operation at the blasting face will be absorbed by the sheet of water.

Referring more particularly to Figures 3, 4, and 5 the device is shown to comprise an outer tubular water jacket 13 and an inner air jacket 14. The air jacket 14 is of considerably smaller diameter than the water jacket 13 and such air jacket is provided with numerous minute perforations 15 for directing the air out into the annular water chamber 16. Thence the water spray or water vapor formed by the commingled compressed air and water in the chamber 16 is caused to issue out forcibly through the perforations 17 and 18 in the outer pipe or tube 13.

It will be noted that there are two sets of perforations 17 and 18 and these perforations are also minute so that they will direct the air and water in a thin stream forcibly for a great distance sufficient to reach the top of the mine drift. The one set of perforations 17 is radially displaced from the other set 18. If it is desired these perforations may be staggered as indicated in Figure 3.

At one end the air jacket 14 is closed by an end cap 19 and at the same end of the device the water jacket is closed by an end cap 20. These caps may be screwed on to the ends of the pipes or tubes so as to be removable or they may be applied in any other manner. These caps may be unscrewed for purposes of passing a cleaning instrument through the two tubes or jackets. At the other end of the water jacket 13 is a T-union 21. This is of approximately the same diameter as the chamber 16 and water is received into this chamber through a nipple 22 connecting by means of a threaded bushing 23 with the branch 24 of the union. Another union 25 provides for connection to a pipe or hose from the source of water supply.

The union 21 also serves as a support for the adjacent end of the air jacket 14. This end of the air jacket is screwed or otherwise fitted into a tubular coupling piece 26 which lies through a threaded bushing 27 screwed into the end of the union 21. A high pressure nipple 28 is threaded into the coupling piece 26 and is also threaded into the elbow 29.

A bushing 30 connects the elbow 29 with a union 31, which union serves to connect the device with a pipe, hose or the like from a source of compressed air supply.

Referring more particularly to Figures 6 and 7, the device herein shown provides for curves in the drift or track and in such instances the water jacket is made in sections 13a and 13b. Also the air jacket is made in sections 14a and 14b. These sections are brought together at the centers thereof, at which point they are coupled to angle unions 32 and 33. The pipe sections may simply be screwed into the unions. This forms a convenient construction also for enabling easy disassembly of the device, packing of the same within small compass for transportation and also enables the device to be more readily taken apart for purposes of cleaning.

After the miners have ignited the fuse and are leaving the face of the drift they turn on the water and air by appropriate valves (not shown). As the holes are blasted, the gas and dust are forced through this spray of water. The water in this state of division absorbs most of the gas and collects the dust, thus making the return to the face of the drift more endurable and healthy. Likewise the device has the effect to lessen the amount of gas and dust throughout the rest of the mine.

The dimensions of the various parts may be varied but a successful form consists of a half-inch pipe for the air jacket and a one and one-half inch pipe for the water jacket. The holes drilled in both the water jacket and the air jacket are 5/64 of an inch.

The line of holes 15 in the air jacket is not directly opposite the perforations 17 and 18 but such line 15 is preferably one-sixth of a revolution to either side. By having this relative angular displacement, the compressed air is prevented from blowing straight from the inner air jacket 14 out the perforations 17 and 18 and is caused to commingle more thoroughly and make a better mixture with the water.

Wherever the use of the word air is used, it will be understood that other appropriate gas is included; and other appropriate liquids besides water are intended to be comprehended within the term water or water jacket.

It will be obvious that various changes may be made in the construction, combination and arrangement of parts which could be used without departing from the spirit of my invention and I do not mean to limit the invention to such details except as particularly pointed out in the claims.

Having thus described my invention, what I claim and desire to secure by Letters-Patent of the United States is:—

1. An improved spray device for use in mines comprising a horizontally disposed tubular water jacket having minute perforations along the upper portion thereof, and a tubular air jacket fitted through said water jacket and having perforations therein angularly displaced with respect to the perforations in the water jacket.

2. An improved spray device for use in mines comprising a horizontal tubular water jacket having perforations in its upper portion for directing a spray upwardly, means at the end portion of the water jacket for connecting the same with a supply of water, a compressed air jacket of smaller diameter than the water jacket fitting through said water jacket and having perforations therein out of radial alinement with the perforations in the water jacket, and means at the end portion of the air jacket for connecting same with a supply of air under pressure.

3. An improved spray device for use in mines comprising a tubular horizontally extending water jacket having two sets of perforations in its upper portion, means for connecting said water jacket with a source of water, the sets being displaced radially, an air jacket within the water jacket and having perforations communicating with the water jacket, which perforations are displaced angularly from both sets of water jacket perforations, and means for connecting said air jacket with a source of air under pressure.

4. An improved spray device for use in mines to prevent spreading of dust and gases comprising a horizontal tubular water jacket having perforations in its upper portion for directing a spray upwardly, a compressed air jacket of smaller diameter than the water jacket fitting within said water jacket and having perforations therein out of radial alinement with the perforations of the water jacket, said water and air jackets being made in sections, elbows detachably connecting the sections with one jacket within the other, means for connecting the water jacket with a water supply, and means for connecting the air jacket with a source of compressed air.

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